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ARBORETUM BULLETIN

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Preparing Your Garden

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Concerning this issue...

"Land with a house attached to it" was the way I viewed my new purchase. I was enthralled with the deep organic soil in the field and abundant worms in the perennial borders—so enthralled that I overlooked the fact that my new home had a bright orange bedroom closet and a living room of gold carpet. In my rapture, I even sent a video of me digging in my loam to my parents, who themselves have transferred a rock outcropping overlain with a sprinkling of dust into a beautiful Maryland landscape.

Each garden differs from others, from topography to the creativity behind it. This issue of the *Bulletin* offers approaches to preparing a landscape—ways to look at developing the basics of new and older gardens—from the soil up (and down). Experts give you suggestions on how to improve the land, choose the right plant for your landscape's special niches, and maintain the personalscape that you have created with your own inspiration.

We've also included a 1995 calendar and indicated some special Arboretum Foundation events. We feel that these events will help you gather information to apply to your own garden. In fact, that is our function; it is why teachers bring students here to learn about how systems function and landscape professionals bring their clients to see specimens and plant combinations throughout the seasons. Showing the possibilities of a Northwest landscape is our purpose as a living museum of conservation, research, education, and display—here in the Washington Park Arboretum.

JAN SILVER, EDITOR

COVER:
Use Washington Park Arboretum to learn how to prepare and maintain your garden. Scenes such as this one help gardeners envision their landscape design and plants from season to season, and as they mature. Photo by Joy Spurr.

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To find which plants in this issue can be viewed in the Washington Park Arboretum, see the newly revised *The Woody Plant Collection in the Washington Park Arboretum*, available in the Graham Visitors Center gift shop.

The *Washington Park Arboretum Bulletin* is published quarterly as a bonus of membership in The Arboretum Foundation, Seattle, Washington. The Arboretum Foundation is a non-profit organization that was chartered to further the development of the Washington Park Arboretum, its projects and programs, by means of volunteer service and fund raising. The Arboretum is administered through cooperative efforts between the University of Washington, its Center for Urban Horticulture (CUH), and the City of Seattle Department of Parks and Recreation. The programs and plant collections are a responsibility of CUH.

The mission of The Arboretum Foundation is to ensure stewardship for the Washington Park Arboretum, a Pacific Northwest treasure, and to provide horticultural leadership for the region. This stewardship requires effective leadership, stable funding, and broad public support.

Articles on gardening and horticulturally related subjects are welcome. Please call the *Bulletin* editor for guidelines or permission to reprint. © 1995 The Arboretum Foundation. ISSN 1046-8749.

Information

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CUH: Public education programs and the Elisabeth C. Miller Horticultural Library; (206) 543-8616, 685-8033.

THE ARBORETUM FOUNDATION: Become a member and receive four issues of the *Bulletin*, 11 issues of the newsletter, plant sale catalogs, discounts, and early notice of programs and special events. Send membership payment to The Arboretum Foundation, University of Washington XD-10, Seattle, WA 98195; (206) 325-4510.

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Evaluating Your Landscape or Garden Site

BY JON HOOPER

Have you ever walked into a landscape or garden and said to yourself, "What a charming and beautiful space" or "What a great area for entertaining" or "I wish we had an area like this for the kids to play. I wonder how they created it"? Well, I can tell you it probably did not happen by accident. Most likely a great deal of time, thought, planning, and examination went into the site and design before a shovel was dug into the ground. By properly evaluating your site and your goals, you will go a long way toward achieving the landscape or garden that you have always wanted.

COURTESY LINDA YOUNKER, BAINBRIDGE ISLAND

A perfect combination of sun, soil, and site make this herb and flower garden suitable for both harvesting and relaxation.

Inspect and Inventory the Site

Prior to doing any work to your landscape or garden site, you must physically examine and inventory the existing conditions. This information will not only tell you what you can and cannot do, it will give you information on how the site needs to be amended to create functional space and good growing conditions. The following is a basic list of questions you need to answer while investigating. Note your observations on a site drawing.

What and where are all the existing significant plants, trees, and structures on the site? Specifically note those that you hope to save.

What are the topography of the land and the physical characteristics of the site? Depending upon its complexity, you may need to obtain a topographical survey. Note the location of any water, rock outcroppings, and historical or geological features. Take advantage of their positive characteristics and be creative with any problems they might create.

What areas of the site get sun or shade and how much? You need to look at the site throughout the day and during the course of each season to get a true picture of light availability. This is significant when selecting plants and planning the garden space. For example, lots of sun is needed for vegetables, such as tomatoes. In contrast, ferns need more shade.

What is the condition of the soil, and is it uniform throughout the site? Dig into the site and have your soil tested for its make-up and fertility. Proper time spent on your soil will pay big dividends down the road.

Does the soil drain? Perform percolation tests. Simply dig a hole one foot wide and one foot deep, fill it full of water, and see if it drains by the next day.

Is there a predominant wind direction? From where and how much does it blow? This can determine areas for socializing and outdoor eating. It also suggests where to place a windbreak.

Are there any significant microclimates on the site—areas that have unique climate conditions due to the topography, vegetation, or buildings? For example, are there any areas especially protected from or exposed to the elements? If you have these kind of conditions on your site, they can make for excellent spaces to support plants and activities that might not normally do well in your region. Protected areas would work well for water lily ponds or, if sunny, an area to ripen figs or melons. On the other hand, exposed areas might indicate the need for a windbreak or shade.

JOHN A. WOTT

Determine what your landscape (here at McVay Courtyard, CUH) will look like over time and from season to season.

What is the adjoining property like? Does it impact your site now, and will it impact your site in the future? Look at the vegetation, structures, noise, and good or bad views. Trees that will mature to shade the house or other plants should be considered at this stage. Privacy from the neighbors may be necessary.

Are the streets quiet or noisy? Check out the noise levels around your site such as street traffic, neighbors, businesses, etc.

Does the site have access to utilities? Locate all the utilities on the site to include water, power, gas, telephone, cable TV lines, and possible septic drainfields or fuel tanks.

Note any other observations about your site; they may become important and vital at a later time.

Goals and Expectations

Part two of the evaluation deals with your goals and expectations for the site. Sit down and seriously think about what activities will occur

there. Start a list of those activities, and add to it whenever you think of or see a functional space you like. View each site as an exterior room with a purpose, just as you would any interior room of your house. In this case, the room will be outside, but it still should retain some connection to the home. The following are possible uses for your landscape or garden that you may want on your list:

Garden (ornamental flowers or trees, specialty plants, herbs, vegetables, water)

Water (streams, pools, fountains, falls)

Barrier (for wind, sound, or visual)

Light or cooling for your home (windbreak, shade, or sun)

Aesthetics (accent, foundation, or backdrop to your home)

Setting for art

Recreation (sport court, putting green, croquet, swimming, etc.)

Entertaining

Outdoor cooking

Quiet area (meditation)

Animals/pets

This list is certainly not complete; I am sure you will think of other uses specifically suited to your lifestyle and desires.

Each of the above functions and those of your own will have specific physical site needs to be successful (e.g., space, topography, sun, shade, soil, power, security). Write next to each item those requirements needed for the success of that activity. Once you have this information you can start comparing your desires with actual site possibilities.

An example of reconciling your goals with your actual physical conditions would be to examine your desire to have a small herb garden located in the back part of the site.

First, list the physical needs of your proposed herb garden, e.g.: 200 square feet, level site, full sun exposure, available water, good soil, near the kitchen door.

Once this is accomplished, examine your site survey results to see how this request matches up with the existing conditions: adequate space, semi-level; partial full sun due to existing tree; water at house; fair soil, easily amended.

Once you have evaluated the activity by comparing it with the existing conditions, you should be able to determine how viable this activity is for the site: In our example it appears that all requirements can be met with a reasonable amount of work at minimum expense.

If your goal is a viable possibility, put it down as a finalist. Remember, sites can be amended to make conditions acceptable for use—but at a cost. Only you can determine if it is worth the effort, cost in dollars, property used, time, or the loss of another goal.

It is very important to perform this analysis for each goal. After completing the process of comparing your goals against your actual site conditions, you need to discover how many of those desires you can actually fit into the site. Prioritize your goals by their importance to you, and spatially lay them out on your site drawing.

Remember to consider the relationship between activities and competing needs. A sport court next to a quiet zone may not fit, but placement next to a street or vacant lot may be perfect. At this point, try to keep the detail to a minimum; just work with space. Once you are satisfied with a general layout, then you can get down to the specific details of each area.

Inventorying and evaluating the site will really pay dividends when it comes to selecting compatible shrubs, trees, flowers, and specialty plants. Every plant will have an improved opportunity to develop if it is planted in a location with the correct soil, the precise amount of light, and proper drainage. Also, the time you spend analyzing your spaces will greatly help you deal with the additional factors of plant selection such as color, size, shape, texture, fragrance, and flower. Constantly refer to your collected information as a guide to proper plant selections.

When to Consult a Professional

The process of evaluating a site can be complicated and involve a great deal of time and work. How do you know when you need professional assistance? Once you get into the inventory and evaluation process you will soon

Washington Park Arboretum Bulletin

discover whether you have the time and ability to complete the task. If not, this is the time to invest in professional help and the reason why there are landscape architects and designers. It is their profession to provide consulting services in all aspects of landscape and garden design. After discussing your goals for the site, the consultant can perform a site analysis and develop a design based on information gathered by both of you.

As you can probably now see, a successful landscape or garden does not happen by accident. It is hard work. To achieve a beautiful and successful garden, first you must perform an inventory of the site's existing conditions, develop site goals and expectations, and then analyze how these two factors can fit together to create an attractive, practical, and satisfying space for your needs.

I know you will find the process rewarding, especially when you hear your friends say, "What a wonderful yard; how did you do it?"

Jon Hooper is Grounds Supervisor, University of Washington, Seattle. He has been a member of the *Arboretum Bulletin* board since 1992.

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Compost on New and Established Sites

PHOTOS & TEXT BY STEPHANIE M. ALLEN

When you consider amending your garden with compost, it is helpful to consider the way it may affect characteristics of your garden's soil.

During the summer of 1993, the benefits and proper use of compost in the garden were shown in the Compost Demonstration Garden at the University of Washington's Center for Urban Horticulture. The project was sponsored by the City of Seattle Solid Waste Utility and the Seattle Water Department. The lessons learned from that project can be utilized in your own garden whether it is new or established.

How Compost Helps Your Soil

Compost supplies organic matter to the soil in a usable form. Organic matter improves plant growth by modifying soil structure and increasing the availability of nutrients and water to the plants. Adding compost breaks up heavy clay soils to create porosity, thus admitting air and allowing water to drain. It increases the water and nutrient-holding capacity of sandy soils and adds essential nutrients to any soil.

In the Compost Demonstration Garden, a sandy subsoil was amended with Cedar Grove Compost, which is derived from yard waste collected by Seattle's curbside yard waste pick-up; it is comparable to any good compost that you would make or purchase yourself. Some of the amended test plots also received a two-inch mulch of compost.

Selecting a Compost

Commercial bagged composts and soil amendments vary in quality. For best results, select a high quality "mature" product. Maturity is reached when the process of breaking down the organic matter by microorganisms is complete. A good, mature compost has the following characteristics: a clean, pleasant, earthy smell; a dark brown color; and a light, crumbly texture in which the plant components are broken down and no longer identifiable.

Using Compost on Established Sites

The easiest way to use compost on established sites is as top dressing. This offers the benefits of adding nutrients, controlling weeds, and conserving water while avoiding the disturbance to established plants, which would occur by digging in the root zone. This method is useful if your garden is blessed with a good soil, neither

too light and sandy nor too heavy with clay. To get a top dressing of two inches deep will require 0.7 cubic yards of compost for every 100 square feet to be covered.

Adding compost mulch improved growth in the Compost Demonstration Garden sites five- to ten-fold as compared with the unamended sandy soil without mulch. Weeds were reduced by about 90 percent, and soil moisture was greatly increased.

Using Compost on New Sites

During the building of a house, topsoil is often removed and the remaining soil is compacted during site preparation. This soil condition is common to both new and old homes where efforts to recondition it have not been made. The best remedy is to incorporate lots of humus or compost into the top eight to twelve inches.

Working a total of five inches of compost into the top foot of soil will require 1.7 cubic yards of compost for every 100 square feet to be covered. Use a rototiller to incorporate the compost in two separate operations. First, apply half the compost and till it in; then repeat with the second half of the compost.

Mixing compost into the soil at the above rate improved growth of plants in the Compost Demonstration Garden by seven- to fifteen-fold as compared with the sandy soil alone. Weed control was evident; the number of weeds were reduced three- to fivefold, even without mulch. Soil moisture was also increased; the compost-amended soil held half again more water as the unamended sandy soil. To maintain a two- to three-inch top dressing, apply as needed.

Maximizing returns from your garden starts with a healthy soil. Compost is an excellent way to condition the soil for the best possible plant growth.

Stephanie M. Allen is an environmental consultant. She has a bachelor's degree in food science from Washington State University, Pullman, and a master's of Forest Resources/Urban Horticulture from the University of Washington Center for Urban Horticulture. Stephanie's thesis is entitled, "A Growth Study of Yardwaste Compost, a Demonstration Garden at the Center for Urban Horticulture."

Sandy soil amended and mulched with compost grew the largest and had the fewest weeds of four trials in a Center for Urban Horticulture test plot.

Soil Preparation for Western Washington Gardens

BY STANLEY P. GESSEL

Simply put, soil is the material in which plants grow. Whether you are a new gardener or well-established and knowledgeable, I want to draw attention to the fact that soil is the material in which your plants grow and which satisfies many of their needs. Therefore, what we do with this material as we prepare for new plants can have a major effect on how plants perform. Following is a discussion of outdoor soil that nature has supplied us in Western Washington conditions, and how to make it work for your garden.

Knowing Your Garden's Soil

Before actually preparing a garden, it is useful to know a little about how the soil originated or, as the soil scientist might say, what its "parent material" is. Did the soil come from the actions of the glaciers that once covered western Washington, from the action of running water, from lake deposits, or just from weathering of rocks and minerals? The origin determines some of the important soil properties that the gardener may want to modify to make the soil more amenable to plant growth.

An example is soil depth. Soil from glacial action may range from very shallow to impenetrable hardpan to no hardpan within the rooting depth. The depth may also be related to your location with respect to hill tops or low areas. Generally, soils are more shallow near tops of hills or on steep slopes.

Your first action may be to increase the soil depth by breaking up at least some of the hardpan or adding soil to the surface. Another means of increasing depth of soils for plants is, of course, raised beds. Once you begin digging in the soil you can explore the depth relationships yourself and take appropriate action.

Another important property of soil that gardeners need to know about, related to the parent materials, is soil texture—the size of individual particles. You may have anything from stones and gravel to sand, silt, or clay. Actually, most soils are a mixture of all of these but with a dominance of one or two. If you have too many stones and too much gravel, you may want to remove some by screening. But if you have too much clay you may want to introduce measures to improve what is called soil structure by adding organic matter or sand.

Having taken this first look at our soil, amending it can be approached in a more systematic way. We can think of the soil properties that affect how our plants grow and how we can improve these.

The soil scientist speaks of these as biological, physical, and chemical properties. Biological properties refers to all of the organisms, such as bacteria, worms, and other living things, that live in the soil and may or may not affect our plants. The gardener may modify the number of organisms in the soil at any given time and the dominance of certain kinds by types of food supplied to the organisms, but usually we do not directly add or remove organisms except for special purposes. The food supply consists mainly of the organic materials added to the soil or found there through natural processes. More information on organic matter will be given in a following section.

Preparing the Soil

In preparing the soil, our efforts usually relate more to the physical and chemical properties, but remember that the changes can also affect soil biology. The physical properties of most interest are those that determine air and water-holding and -moving ability and allow ease of root development. Therefore, our efforts are directed toward improving soil structure and porosity by tilling the soil, which also incorporates organic matter we may have supplied on

the surface, throughout the entire rooting depth. Adequate tillage is a first step in preparing new or old gardens, especially if they have any problems with soil texture or structure. For the home garden, this means spading in the time-honored way or some form of power tilling.

Adding Organic Matter

All gardens must have a proper supply of organic matter, which should be adequately tilled into the soil to get its full beneficial effects. Organic matter is probably best supplied in some form of compost, which means that it has undergone at least partial decomposition, but generally the more decomposed the better. Organic matter does a number of things in the soil that include improving water-holding ability and air movement, preventing loss of essential elements through leaching, and supplying food for organisms and essential mineral elements for plants.

The composting process reduces carbon while conserving nitrogen and also improves the physical nature of most organic matter. Organic matter with a very high carbon content relative to nitrogen can cause a severe nitrogen deficiency in plants, because organisms decomposing the organic matter may use all of the nitrogen in this material, leaving none for plants. Nitrogen is the nutrient that most commonly limits plant growth in Pacific Northwest soils. Fresh organic matter and especially forms such as sawdust and coarse plant stems all have high carbon and low nitrogen, expressed as high C:N ratios (C:N ratios in the order of 20–50 to 1, whereas ratios of 10–15 to 1 are desirable). The easy way to change the ratio is by adding more nitrogen to the compost soil mix or to the compost. This is a good way to make use of your grass clippings.

Many types of composts are now available commercially for gardeners, including some from sewage materials (now called biosolids). You can make your own compost, and instructions for composting are readily available.

Supplying Essential Elements

The next concern in preparing the garden soil is supplying all the essential elements for adequate and normal plant growth. There is a difference between the *total amount* of an element in the soil and the *amount available* (usable) for plants at any given time. Obviously, available nutrients are of most concern for

USDA PHOTO

Add enough organic matter to your soil, probably best supplied by compost.

gardening efforts, and they should be maintained at optimum levels for plant growth.

The availability of soil nutrients depends upon the amount in the soil, but it also depends upon soil pH, the measure of acidity or alkalinity. Alkaline soils are not a big concern in the Pacific Northwest, though some of the dry land soils of eastern Washington do have alkalinity problems. Many natural processes in this climate, such as leaching by movement of rainwater and by-products of plant decomposition, cause most of our soils to be at varying degrees of acidity west of the Cascade range.

Soil pH is easily measured with various kinds of test kits available at most garden stores. It can be modified toward the neutral or alkaline side by the application of ground limestone. A rough rule of thumb is that a ton of ground limestone per acre is needed to raise the pH by one unit. Putting this in smaller units, you would apply about five pounds for each 100 square feet of garden.

Elements needed in largest amounts are nitrogen, phosphorus, potassium, calcium, and magnesium. Again, simplified test kits are available which, when properly used, will give the gardener some idea of the amount of elements in soils, but they are not always satisfactory.

Analysis of samples by a regular soil-testing laboratory will produce more reliable results and can give fertilizer recommendations. Lacking this, assume that under normal conditions some annual addition of the essential elements is needed because they are withdrawn by plants and lost through leaching.

The element needed in the largest quantity usually is nitrogen. Deficiency of nitrogen in your plants is usually apparent by a yellowish color. Many of our soils also may have special needs for the addition of phosphorus because of unavailability.

Fertilizers may be purchased as individual elements or in mixed form. The amount of the element in the fertilizer is given as a percentage. In a mixed form, this may be listed as 20-10-10, which means 20 percent nitrogen, 10 percent phosphorus, and 10 percent potassium. The other 60 percent of your bag of fertilizer is determined by the kind of fertilizer you purchased. Therefore, it may or may not be a useful addition to the soil. The most common elements would be calcium, potassium, and sodium. Appropriate quantities of the fertilizer may be sprinkled in the seed furrow at planting time and mixed in, or applied at the time of tillage. Roughly, per 100 square feet of garden, you need 2.5 pounds of a 20-10-10 mixture.

If you want to further explore how to best manage garden soil, consult your County Extension agent, who has a great deal of printed material available (See "For Further Information," this issue).

Dr. Stanley Gessel is professor emeritus, College of Forest Resources, University of Washington. He is a former member of the editorial board of the *Washington Park Arboretum Bulletin.*

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Some ABCs of pH

BY RICHARD B. WALKER

JOY SPURR

Why Is pH of Interest?

Some gardeners believe that they must have a soil analysis made before going ahead with soil preparation. As useful as such an analysis may be for the professional grower, it usually is of limited value for the home gardener. On the other hand, soil pH can be quickly determined and provides valuable indications about the properties of the soil, such as nutrient availability. Testing different parts of your garden separately is advisable, unless the soil is very uniform.

What Is Soil pH?

Soil pH is a measure of the acidity of a soil:

Less than pH 4.5 - very acid
pH 4.5 to 5.5 - acid
pH 5.5 to 6.5 - somewhat acid
pH 6.5 to 7.5 - near neutral
above pH 7.5 - alkaline

What Does the pH of a Soil Tell Us?

Mineral elements when dissolved in the soil solution occur as ions, i.e., as positively charged particles (cations) or negatively

charged particles (anions). A soil in the neutral range holds its maximum amount of the major nutrient cations (calcium, magnesium, and potassium). The lower the pH, the less saturated the soil is with respect to these cations, thus less able to supply them to plant roots. In acid soils, part of the nutrient cations have been replaced by hydrogen and aluminum ions. In very acid soils, the aluminum ion concentration may be high enough to be toxic to plant roots.

Valuable soil bacteria, such as those that break down raw organic matter into humus, are favored by pH in the neutral or only weakly acid range. This is true also for earthworms. Thus, soils in this range tend to have a better "crumb" structure, which makes better aeration and drainage possible.

The availability of phosphorus, an element often limiting plant growth, is highest in the near neutral pH range. Especially in acid and very acid ranges, phosphorus becomes fixed in forms unavailable for absorption by roots.

Availability of Trace Elements (Micronutrients)

Iron, manganese, zinc, and copper, which are needed by plants to synthesize chlorophyll and in other enzymatic reactions, are optimally available in the pH range of 5.5 to 6.5. At pHs higher than this, they become less and less easily absorbable by the roots. Conversely, at low pHs, their solubility increases, sometimes to the extent that plants absorb depressive or toxic amounts.

Boron (involved in carbohydrate metabolism) and molybdenum (needed in nitrogen utilization) are also optimally available in the moderately acid range, but in the alkaline range boron decreases in availability, whereas molybdenum becomes more soluble. In very acid soils molybdenum becomes only slightly available.

Plant Preferences

Plant species differ in the amounts and proportions of the essential mineral elements that favor good or optimal growth. Thus the effects of pH on the availability of mineral nutrients described above sometimes cause particular plants to grow best in certain pH ranges. For instance, the high requirements of many ericaceous plants (heath, rhododendron, etc.) for iron and manganese make them grow best in acid soils. On the other hand, legumes often grow best in neutral or slightly alkaline soils in which calcium and molybdenum are in good supply. For information about the pH preference of individual plant species, contact libraries and extension agents.

Measuring and Adjusting pH

Scientists use special pH meters to measure pH, but these are rather expensive for the home gardener. However, kits for colorimetric estimates of pH can be purchased in garden stores and give results adequate for most needs.

Soil pH can be increased readily by liming and can be decreased by adding sulfur (although this is seldom needed west of the Cascade range). Dolomite lime should be used on soils not previously limed, but it cannot be used repeatedly, because this may build up magnesium to too high a level, especially in relation to potassium. Every five to ten years should be often enough to apply dolomite, but calcic lime might be usefully applied every two to three years if growing garden vegetables or other plants not adversely affected by higher pHs.

PHOTO: Many ericaceous plants (such as heath and rhododendron) have high requirements for iron and manganese, so they grow best in acid soils, pH 4.5 to 6.5. Here in the Joseph A. Witt Winter Garden are willow, *Salix gilgiaha* (background); early blooming *Rhododendron* 'PJM', above the spreading heath, *Erica* 'December Pink'; and white-blossomed *Magnolia stellata (right)*.

Dr. Richard B. Walker is former chair of the Department of Botany, University of Washington, and professor emeritus. He has served on the editorial board of the *Washington Park Arboretum Bulletin*. Dr. Walker's special area of interest and research is the mineral nutrition of plants.

Join the Plant Health Care Revolution

BY VAN M. BOBBITT

While a national debate rages over human health care, a quieter revolution is taking place in plant health care. Similar to holistic medicine, the new focus is on promoting total plant health rather than reacting to pest problems.

Beyond Integrated Pest Management

You may have heard of integrated pest management (IPM), a process that depends upon frequent monitoring for pests so that control strategies are only used when and where needed. The IPM practitioner may employ a variety of strategies—cultural, biological, and chemical.

Ten years ago, IPM was a big step forward in terms of reducing pesticide use. For example, the University of Maryland Entomology Department was able to reduce pesticide usage by ninety-four percent when it converted twenty-six suburban landscapes from three cover sprays per year to using an IPM approach. Most of the customers said the appearance of their plants was just as good under the new system (Holmes and Davidson 1984).

For home gardeners, though, IPM does not go far enough. IPM emphasizes *pest management,* while our concern is with *healthy plants.* The distinction may seem minor, but it makes a big difference in the way we approach landscape plant management. If we focus on pests, we overlook many of the problems afflicting plants. At the Washington State University (WSU) Puyallup plant clinic, for example, half of the sick plants brought in for diagnosis are not suffering from diseases or insect pests. Instead their problems result from cultural and environmental factors such as overwatering, drought stress, or winter damage.

The Plant Health Care Management System

In an attempt to develop a more holistic system that focuses on healthy landscapes, several terms have been suggested—integrated plant management, integrated landscape management, sustainable landscaping. However, one term that has received widespread acceptance, at least in the tree care industry, is Plant Health Care (PHC).

PHC is as much a change in attitude as a change in technique. Not only does it emphasize plant health over pest management, it takes an ecosystem approach that recognizes the interrelatedness of all things; it emphasizes working with nature instead of fighting nature; it sees proper culture as the foundation of a healthy landscape:

> This system [Plant Health Care] of plant management parallels advances in human health maintenance: preventive care, frequent monitoring, early detection of problems, and use of integrated treatments to provide long-term, stable solutions to them (Smith et al. 1992).

PHC is not a repudiation of IPM. Basically, PHC has evolved from IPM, still incorporates all IPM principles, but is more holistic and proactive than IPM. It also includes the belief that good culture is the foundation of a healthy garden.

PHC: Know Your Plants

The first step in implementing a PHC system in your yard is to inventory your landscape: Identify and list all plants on site. How can you take care of your plants if you do not even know what they are? Once you have a plant list, do some research to learn more about your plants: cultural needs, likely pest problems, common environmental problems. During this research, you will uncover some key plants—those that are problem prone and likely to require the most attention.

Key plants vary from region to region. An informal survey of WSU Cooperative Extension agents, staff, and Master Gardener volunteers in western Washington indicated that rhododendron, dogwood, spruce, rose, and azalea are key plants; they are often brought to Cooperative Extension offices for diagnosis of insect and disease problems. A key plant list can help you focus your plant management efforts. You also may decide to eliminate some key plants from your landscape to simplify maintenance.

Determine Key Problems—Biotic and Abiotic

After identifying the plants in your garden, you can determine the key problems, both biotic (living organisms such as insects, diseases, slugs, and deer) and abiotic (cultural and environmental). Key problems are the ones most likely to impact plant health and require your attention. For example, rhododendrons are often diagnosed as having problems with root weevils or from poorly drained soil. Learn more about these key problems if you grow rhododendrons. For biotic problems, be able to identify the pest at various stages of its life cycle, recognize symptoms of its damage, and know which management options are both effective and environmentally sound.

Study Your Landscape Ecosystems

The next step is to study your landscape ecosystems. Your garden truly is an ecosystem with complex interrelationships between flora, fauna, soil, climate, and other factors.

Be aware of climatic factors: minimum temperatures likely to be encountered, the amount of sun various parts of your garden receive, prevailing winds, and seasonal patterns of precipitation. You must understand soils and drainage patterns. Consider, also, the impact on your landscape of animals, such as squirrels, dogs, and deer. This information is essential, because healthy plants result from carefully matching plants to the environmental niches in your yard.

Landscapes are dynamic, so we need to monitor them constantly to keep up with the changes. There may be sudden, severe changes brought on by an unusual occurrence—the 1993 Inauguration Day storm, for instance. There are predictable seasonal changes (e.g., the appearance of aphids on the new growth of roses). And there are gradual changes that take place over the years, such as the increasing shade in a yard as trees reach full size.

A key to any PHC program is monitoring at least every two weeks during the growing season and perhaps once a month during the winter. In doing this, pay particular attention to signs of plant stress (yellow or wilted leaves, dead twigs, etc.), and be on the lookout for developing pest problems. Concentrate your monitoring on key plants and key problems.

JOY SPURR

The Plant Health Care (PHC) management approach recognizes that key plants, such as dogwoods, are prone to problems. For this reason, the Arboretum selected the above dogwood introduction from British Columbia. One parent is the Northwest native, *C. nuttalii*, which is prone to disease, insects, sunburn, and injury, but this is lessened by the influence from the other parent, *C. florida*, which is easier and more successful to grow.

Do All You Can to Promote Plant Health

There are two differences between IPM and PHC. While IPM focuses on pest management, PHC focuses on plant health. While IPM sees culture primarily as a pest management strategy, proper culture is the basis of the PHC program.

So how do we promote plant health? It starts with good landscape planning: Select pest-resistant plant species, match plants to the existing climatic and soil conditions ("right plant, right place"), and plant a diversity of species to limit infestations.

The next step is using proper cultural practices: Improve soil conditions with the use of organic matter and mulches, proper planting methods, and careful attention to watering, fertilizing, and pruning (too much of these last three may be just as bad as too little). The use of sound cultural practices will benefit any landscape, whether new or well-established. But those who are installing a new landscape have a real opportunity to do things right from the beginning.

If we seriously promote plant health, we avoid many problems (preventive medicine). Cultural and environmental problems are minimized, and healthy plants are better able to withstand insect or disease damage.

Consider a Variety of Strategies

Finally, when pest problems do occur, consider a variety of options: (1) no action, (2) cultural, (3) biological, (4) chemical, and (5) combined tactics.

"No action" can be a valid approach if the pest is not life-threatening to the plant. Ask yourself what is likely to happen if no action is taken. Will the pest create a serious nuisance, such as honeydew-dripping by aphids on a birch tree that overhangs your parking spot, or is it primarily an aesthetic problem, as are root weevil-riddled leaves on a rhododendron? Pesticides are often needlessly applied because we overreact to the presence of a few "bugs" on our plants.

While PHC sees plant culture as primarily a proactive, preventive tactic, cultural techniques also can be employed after a pest is observed. For example, pruning out a tent caterpillar nest can effectively solve the problem.

Biocontrols are living organisms used to manage pests. They are always at work, but we can assist nature in this effort. First, minimize pesticide usage that can decimate beneficial organisms. Second, manage your landscape to provide a better habitat for beneficial organisms. Planting a variety of flowering plants can help, since many beneficial insects need nectar and pollen from flowers for food. While there is little research into this area, observations indicate that plants in the parsley family (e.g., dill, fennel, coriander) and the sunflower family (e.g., daisy, yarrow, marigold) are especially accessible to many of the small beneficial insects (Olkowski et al. 1991). As a third step, you can purchase and release beneficial organisms into your landscape, either to augment existing populations or to introduce new beneficial species. This last step is usually not necessary if the first two steps are followed.

PHC and IPM approaches do not rule out chemical management strategies. But chemicals should only be used with great care, just as prescription drugs are used in human health care. In PHC, chemical strategies are used to augment, not replace, good cultural practices. Preference is given to biorational pesticides—ones that have minimal negative impact on the environment. The Davey Tree Expert Company (headquartered in Ohio, with a branch in Bellevue) found that PHC reduced its use of traditional pesticides by seventy-five percent, largely by substituting biorational alternatives such as horticultural oils and insecticidal soaps (Funk 1988).

Another rule of pesticide use in PHC is to target applications. The University of Maryland IPM project reduced pesticide use by ninety-four percent, primarily with targeting. Instead of spraying the whole yard, pesticides were only applied to those plants with pest problems and only at times when the pest would be susceptible to the pesticide (Holmes and Davidson 1984).

And finally, the best results are usually obtained by a control strategy that combines several compatible pest management strategies: cultural, biological, and perhaps chemical.

PHC *does* work. This approach can drastically reduce pesticide usage. It can result in healthier plants. It is environmentally sound. But it is a radical departure from the simplistic "magic bullet" approach: the idea that a product is available to conveniently solve any problem. Such

an approach is based more on clever marketing than on good science. Plant health care is not a product-based approach, it is an information-based approach. It takes time, it requires work, but it provides long-term, environmentally sound results.

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1995

The Arboretum Foundation Calendar

February 21
Preview Party for the Northwest Flower & Garden Show

March 4
Book Sale

March 21
New Member Orientation

March 18 through April 22
Spring Waterwise Gardening Series

April 28
Spring Plant Sale Preview for Arboretum Foundation members

April 29
Spring Plant Sale

October 1 & 2
Bulb Sale

December 1
Holiday Party for Arboretum Foundation members

December 2
Greens Galore!

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TOP: *Embothrium coccineum* (Chilean fire tree)
CENTER LEFT: *Actinidia kolomikta* vine
CENTER RIGHT: *Lindera obtusiloba*
BOTTOM: *Prunus subhirtella* 'Rosea'

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Caring for Your Garden: A Maintenance-Management Approach

BY GAEL VARSI

Maintenance is the glue that holds a garden together. It is an essential ingredient in conserving the integrity of the design and vitality of the plantings. Maintenance can be defined as the routine, week-to-week operations involved in the upkeep of a garden, such as weeding, grooming, and pruning. ***Management*** is concerned with longer-term planning and efficient use of available resources.

Without a consistent schedule of care, a garden can quickly become a tangle that will then require greater effort and more time to maintain. Plants that are stressed by lack of appropriate care are prone to attack by pests and diseases. A plant will require less maintenance if properly planted in a suitable site that has been well prepared for it. Maintenance begins with site preparation and plant selection.

Too often, the emphasis in a garden is on the design or installation without adequate consideration or provision for continuing maintenance. The type of maintenance required is relative to the intent of the garden. A formal garden has much different maintenance requirements than a wildflower meadow. Because gardens are not static, but continually growing, maintenance needs will change over time. Sometimes a design or planting does not grow as anticipated or requires more maintenance than expected.

Unfortunately, maintenance is usually the first area in a budget to be cut. In the majority of public gardens, reduction in field staffing is a common occurrence. Garden managers must look at efficient ways to manage their available resources. It is usually the case of having to do more with much less and demands effective organization.

Maintaining and Managing Your Home Garden

In the late 1970s, Richard Harris (author of the classic *Arboriculture: Integrated Management of Landscape Trees, Shrubs and Vines*) proposed a management approach to maintenance as a means to increase effectiveness and efficiency. Since then this approach has been adopted by many landscape professionals as a standard for landscape management. Although intended for use in public parks, some of Harris's key steps can be applied to a maintenance-management plan for the home garden.

Richard Harris's key steps applicable to the home landscape are the following:

Inventory the physical resources to be maintained. Those resources that must be maintained need to be identified, described and quantified. How much of what must be maintained? How many trees and shrubs of what types? Note the condition of the plants. Besides the plantings, the inventory should include the garden hardscape as well as tools and irrigation.

List and describe tasks. What are the cultural requirements of the plants in your garden? Many excellent books list cultural needs of garden plants. Also, look at a plant's native habitat and community associations for good indicators of its cultural requirements. Then, consider what work needs to be done to maintain the garden resources you identify at a level of care acceptable to you.

Work common to most gardens includes:

controlling weeds
fertilizing
grooming
irrigation
maintaining edges and paths
monitoring plant health
mowing
mulching
pest control
planting and transplanting
preparing and amending soil
pruning

Determine how frequently each task needs to be done. The frequency of a task determines the quality of maintenance. It is not necessarily how the job is done, presuming it is being done to acceptable horticultural standards, but how often it is done that is the key to quality maintenance. Different levels of maintenance for different areas are possible by varying the frequency of tasks.

Monitor the garden. The garden must be monitored so that the maintenance program can be periodically evaluated and adjustments made, if needed. Monitoring is basically walking through the garden and observing how the plants are growing. This is the core of plant health care. Plant health care is the ongoing focus of maintenance.

I would add the following steps for home gardeners:

Observe the microclimates of your garden throughout each season. Determine whether the plants in your garden are located in suitable sites that provide the environment they need for healthy growth. Often plants have problems that are directly related to site conditions or poor cultural practices. A plant in stress will be much more difficult to maintain.

Certain cultural practices can make garden maintenance easier:

Before you plant, good soil preparation is essential. Most garden soils need some work initially and then periodically thereafter. A soil test is a wise investment in the beginning. Add organic matter to help both sandy soils and heavy clay soils by improving soil structure. Organic matter is necessary for an active soil since it feeds the soil microorganisms that play an important role in recycling nutrients. Include composting in the garden care plan, if possible; it provides a resource for soil amendment and mulching.

Place plants in appropriate sites and associations. Group plants together that have the same cultural requirements such as water-loving plants in one area or summer drought-tolerant plants in another. When you mix plants that have different cultural needs, you increase the maintenance time necessary to keep the plants healthy.

Mulching provides many benefits. Mulch deters weeds and aids in the retention of soil moisture. As mulch breaks down, it is incor

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porated into the soil and becomes a soil amendment. Mulch also reduces surface crusting and compacting.

How and when you perform a task contributes to the effectiveness of your maintenance time. An example is weeding. If you do not get all the root out with the weed, the root will keep growing and the weed will resprout. It is more effective to pull a weed before it flowers than after it has gone to seed. Also, good tools make garden maintenance more fun and not so physically tiring.

Sequence your garden activities. For instance, weed from the back to the front of the bed so you do not walk all over what you have just been working on and compact the soil. If you throw weeds and garden debris on a tarp or in a bucket instead of the ground you save yourself time. A thorough fall cleanup and top-dressing of garden beds with compost will give you a head start on spring maintenance. A midsummer grooming of flower beds will often extend the flowering season. The seasonal maintenance requirements of your garden will depend on the type of plants it contains.

There are many benefits in preparing a maintenance-management plan. It can increase effectiveness of your maintenance time, provide a framework for decision making, and be used as a tool for setting priorities. The process of developing a plan increases awareness and understanding of the work that must be done to maintain the garden. Maintenance need not be overwhelming. A maintenance plan can make garden care more effective and enjoyable.

Gael Varsi is a recent graduate of the master's of Forest Resources/Urban Horticulture program at the University of Washington Center for Urban Horticulture. Her thesis was entitled "A Maintenance-Management Plan for the J. A. Witt Winter Garden at Washington Park Arboretum." Gael currently operates Varsi Gardening Services on Vashon Island and has been working on restoring the Mukai Garden—a historic Japanese-American garden (1926–1942).

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All these books can be found in the Elisabeth C. Miller Horticultural Library at the Center for Urban Horticulture.

Home Garden Irrigation

BY VALERIE EASTON

All of the books and journals listed below are available in the Elisabeth C. Miller Library, Center for Urban Horticulture. Free and low-cost publications are also available from the Washington State University–King County Extension, (206) 296-3900. Examples include EB1090, "Watering Home Gardens and Landscape Plants," and B4828, "Drought Advisory: Surface Irrigation Systems." Many journals carry articles on home irrigation. Below are some for home gardeners.

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Beautiful Plants, Northwest Niches

BY WILLIAM B. TALLEY

Selecting the right plant for a special place in the landscape can be a delightful adventure. In addition to satisfying aesthetic concerns, plants are selected to fill specific niches in the Northwest garden, such as a need for low water or predominant shade. Plants are now being closely considered not only for their beauty, but for the way in which they serve the environment for which they are intended.

Selecting for Design

Specific plant forms, textures, and colors can be selected while planning your garden. Spurts of new plant introductions seem to occur every decade, causing renewed excitement in gardening and landscape design. Recent introductions have included a huge assortment of ornamental grasses and hardy perennials and new groundcover choices. A remarkable range of specialty nurseries offers these plants as well as old favorites.

Landscape architects most often select plants for a balance of design reasons, but most important to me are the sculptural qualities that plants give in forming the landscape. The desired sculptural forms are first identified and then illustrated with all three dimensions in mind. The designer's vision must also encompass anticipated changes as growth occurs.

Selection for form begins with the overall design, and the largest forms are chosen first: usually the trees, followed by large shrubs, medium shrubs, small shrubs, and ground covers, which are nearly two-dimensional in form.

Selection is further determined by considerations of plant texture, with traditional regional preference for contrasting textures, e.g., fine contrasted with bold, needle versus broadleaf. Color selection of foliage is more subtle, less predictable. Some designs lean toward brightly contrasting leaf color, while other designs depend on seasonal contrasts such as autumn deciduous color or the spring color of emerging shoots, such as the scarlet to pink range of *Pieris formosa*.

Boxwood illustrates a spherical form of approximately three feet growing to six feet in time. Columnar Italian cypress (*Cupressus sempervirens* 'Fastigiata') is a vertical narrow cylinder, and similar are selected forms of Lawson false cypress (*Chamaecyparis lawsoniana*), such as 'Allumii' and 'Kilmacurragh'.

Probably the strongest architectural factors in plant selection occur with the need to screen out views or frame them, treating the landscape decision as an extension of or substitute for the built environment. Hedgerows and windbreak plantings, while originally established for different reasons, serve to illustrate the scale and impact that plants can have in the visual environment. Sometimes this visual control is quite dense, such as with a mature English laurel hedge, and other times quite filmy, like a bosque of gray birch in an Ingmar Bergman film.

Selection is often made in reference to the historic use of certain plants: how they first served as landscape elements and how they are continuing to be used. This is easily recognized in the use of boxwood for hedges. A visit to Williamsburg, Virginia, can give many other examples of the recreated historic use of plants.

The mid-twentieth century gardens of the major modernist landscape architects—Christopher Tunnard, Fletcher Steele, and Thomas Church—illustrate the historic use of plants in transitional roles toward modern juxtapostion for structural clarity. The simplicity of the repetitive form of plant groupings also reinforced the built form—the walls, paths, terraces, stairways, and pools of those landscapes.

Selection to highlight flower and fruit characteristics is often in the palette selection of the design program. Because of its short-term effect in the landscape design, this consideration is more of a bonus to other selection factors.

One other truly topical interest due to emerge again is the use of food plants as ornamental landscape. For centuries, vegetables have been grown either formally, as seen in the moated garden at Villandry, or informally, so beautifully illustrated in the cottage gardens of the

JOY SPURR

LEFT: For texture and color in the garden is the tall *Rubus biflorus* with the popular grass, *Carex morrowii.*
RIGHT: Fruits and leaf for color with *Sorbaronia dippelii.*
BELOW: Food plants are enjoying a resurgence in Northwest ornamental gardens.

Cotswolds of England. The swell of interest in food plants that emerged in the 1970s diminished in the late 1980s. The comfort of seeing beautiful food plants and tidy herb beds with that promise of fresh taste will surely pull this appealing interest back into popularity.

Selecting for Cultural Needs

Plants for disease and pest resistance, narrow sites, shade, damp, low-maintenance, and low-water areas are now selected at the design planning stage for both aesthetic and cultural reasons.

An example of this is the concern for water resource management, which has triggered a close look at drought-tolerant (or extensively rooting) plants, and many of the newly available plants satisfy this need. Among the newer introductions are special cultivars of natives, which can be expected to adapt the very best to drought conditions. An example is *Arctostaphylos* (manzanita) hybrid 'Emerald Carpet'.

The science of determining which plants conserve water best and how to group them responsibly has been investigated and lists have been developed to help guide the selection process. Some of the best work of this kind has been done by Dr. James R. Clark, a former faculty member at the Center for Urban Horticulture, and his colleagues in the San Francisco Bay area. The research method that emerged, called the

COURTESY LINDA YOUNKER, BAINBRIDGE ISLAND

landscape coefficient, refers to how much water is required to keep a certain level of quality and vigor in the landscape.

In the areas where water use is being seriously monitored, there is a constant need to address irrigation efficiency in order to be able to continue receiving water for the landscape. The

irrigation industry has developed devices to count water and quantify how it is distributed, which all returns to the need for grouping plants with equal water requirements.

"Skinny" houses on infill lots have reinforced the urban requirement for vertical plants in the precious slivers of space available for landscape. Fortunately, the availability of splendid hybrids of *Acer palmatum* (Japanese maple), *Pyrus* (ornamental pear), and *Amelanchier* (serviceberry or shadblow) have helped to fill the need for durable vertical trees, and there are counterpart shrubs that also bring soft foliage interest and color to an otherwise hard environment. The newer plants are often selected or bred to fit the more harsh urban environment. They are more disease resistant and can tolerate temperature ranges that previously limited plant selection. With enthusiasm for plant diversity and more general horticultural knowledge, the preparation of soils, feeding of plants, and improved pruning and care have emerged as the key to landscape vigor.

Extension of the urban built environment into the rural and wooded landscape has also brought a more extensive evaluation to discover which plants can be expected to best resist the foraging of deer and rabbit populations. This includes thoughtful groupings of plants with similar needs outside the defended area or within it.

In all successful selection for landscape design, horticultural considerations for sun/shade preference, soil and moisture implications for vigor, and the grouping of plants to achieve maximum favorable environment must be thoughtfully achieved. In some instances, symbiotic relationships occur, which increases probability of plant success. This is illustrated by the dependent mycorrhizal effect on madronas that is present when seed germination occurs in the vicinity of Douglas-fir roots. Those seedlings appear to be enhanced in vigor from the effect of soil fungi on nutrition and biological stability. Other beneficial effects have been noted for centuries by observant gardeners in favorable symbiotic groupings of plants, such as growing chives and marigolds with roses to reduce aphid infestation.

Meeting of Design and Cultural Suitability

In Seattle, the tradition of great plant diversity has emerged from having a temperate climate. The introduction of the Heath family hybrids alone throughout this century has truly given the Puget Sound region a character that is both different from the original native environment and also different from most other garden environments of the world. The soils and climate of England produce a very close counterpart to the Puget Sound landscape, but the visual image and association of design context are decidedly different.

New associations of plants for resource conservation have also produced a different visual landscape. The infusion of ornamental grasses and exotic, dramatic perennials found in the landscape designs of Wolfgang Oehme and James Van Sweden have had an enormous effect on the central thrust of landscape design plant selection at the end of this century, not only in our region but throughout America. Again, that design character had surfaced previously in the designs of the eminent mid-twentieth century Swiss landscape architects, Gustave and Peter Aaman, but with more softness in character.

One of the compelling facts about water conservation is that lawns requiring inordinate quantities of water are being legislated out of design in areas where drought conditions are most severe. This has created a need for lawn substitutes, which is still being explored. Groundcover plants and extended paved areas tend to be most often found as the solution with an eye toward providing more bright green plants to avoid the "dusty" look that California housing developers deplore.

These serious concerns for resource conservation have helped to generate the availability of a huge new array of plants and nurseries that specialize in providing them.

Selecting the right plant for the right place is always an engaging process because the depth of factors involved reaches into art, science, history, and personal association. It reflects the excitement of exploration, the memory of faraway places. It is grounded in the knowledge of horticulture and your own garden's conditions, and it gives physical form to design ideas. It captures our interest and compels us to seek greater knowledge.

William Talley, of the landscape architecture firm of Pascoe & Talley, Inc., also works at the University of Washington as campus landscape architect.

COURTESY, UNIVERSITY PHOTOGRAPHY, UW

New on the Shelves of the Elisabeth C. Miller Library

BY VALERIE EASTON

The winter months are a gardener's chance to plot and plan, to dream and seek inspiration for the upcoming seasons. Providing fuel for these fireside schemes are new books on artists' gardens, color harmonies, and a look at influential British women gardeners, past and present.

Cox, Madison. *From Claude Monet to Jennifer Bartlett: Artists' Gardens*. New York: Harry N. Abrams, Inc., 1993. ISBN 0-8109-1931-1. From eccentric and urban to sweetly pastoral, these 25 gardens created by visual artists showcase the garden as personal statement, as living art. The cobalt blue structures setting off palms and cacti in the Moroccan garden created by painter Jacques Majorelle, the tumble of rocks against a single cherry tree in the garden of the Japanese sculptor Isamu Noguchi, as well as the more familiar flower-filled English garden of Vanessa Bell and Duncan Grant expand the concept of what a garden can be. Stunning photographs illustrate the possibilities of texture, line, color, light, and form used to create these living masterpieces.

Harper, Pamela J. *Color Echoes: Harmonizing Color in the Garden*. New York: Macmillan, 1994. ISBN 0-02-548185-1. Harper first wrote about her idea of color echoes in a 1987 *Pacific Horticulture* article, and here she expands the concept she describes as "the repetition of color as a means of creating unity, serenity, interest and charm in the garden."

This could be a useful way to organize gardens for those who like to use a variety of plants and do not have the space to plant in large drifts. Not just flower color but also foliage, bark, berry, and garden ornaments are considered important. Numerous, excellent color photographs illustrate color harmonies and contrasts.

After a discussion of color theory and suggestions for hundreds of plant combinations, Harper launches into the real heart of the book. She chronicles her successes and failures over several seasons in the planning and creation of two large borders organized by color echoes.

Penn, Helen. *An Englishwoman's Garden*. London: BBC Books, 1993. ISBN 0-563-36430-0. Published to accompany a BBC television series, this is a wonderful book about women who make gardens. It explores why these British women garden and what persistence, genius, and passion have gone into their accomplishments. There are many historic photographs, including one of Beatrix Havergale, founder of the Waterperry School for Lady Gardeners and the model for Roald Dahl's terrifying Miss Trunchbull in *Matilda*. Worth the price of the book are photos of Margaret Mee painting the Amazon moonflower by lantern light and Valerie Finnis in her cobwebby potting shed, complete with imposing hat and wrinkly old pug dog.

Helen Penn's engaging portraits are fascinating in their details of daily life, from well-known authors such as Beth Chatto, Margery Fish, and Rosemary Verey, to early illustrators for Kew whose work appeared under the names of male administrators. Lys de Bray, gardener and botanical artist, describes the typical British gardening woman as "middle-aged, eccentric and exceedingly positive." Whether authors, nurserywomen, artists, or landscape gardeners, these women have followed circuitous routes to their profession, often waylaid by husbands, babies, and housework, but each has followed her interests and talents to contribute to our horticultural heritage.

For Further Information: Garden Preparation

BY VALERIE EASTON

Whether you are creating a new garden or enhancing an old one, there are resources to consult before you even plunge your shovel into the dirt. Frequently, the most useful information is not packaged with glossy color photographs or even put out by major publishers.

• WASHINGTON STATE UNIVERSITY COOPERATIVE EXTENSION provides practical publications and services for home gardeners, tailored to our local soils and climate. Services differ between counties. For Kitsap County, call (360) 876-7157; Pierce County, (206) 591-7180; Snohomish County, (206) 338-2400.

• KING COUNTY COOPERATIVE EXTENSION, (206) 296-3900, provides the following:

Publications: Send a stamped, self-addressed envelope to the King County Cooperative Extension office for a list of county publications, which can then be ordered over the telephone. KC 112, "3-Way and 5-Way Soil Mixes"; EB 1102, "Soil Management in Yards and Gardens"; and EB 1505, "Planting Landscape Plants" are three of the hundreds of extension bulletins available on a great variety of topics. They are written and kept updated by experts. In addition to requesting them by phone, you can visit the Cooperative Extension office in the Smith Tower (506 2nd Ave., Suite 612, Seattle, WA 98104) to page through these publications and consult indexes. A current set of all extension publications is available in the Elisabeth C. Miller Library.

Dial Extension: This listening library, accessed by telephone, has more than 200 short, informative tapes on gardening topics such as pesticide safety, soils, composting, plant selection, etc. Call (206) 296-3900 to request the brochure listing the available tapes by topic and number, then call the Dial Extension number, (206) 296-3425 to listen to them.

Master Gardeners: These volunteers, who have gone through extensive training, are available to answer your gardening questions and are backed up by the expertise of Cooperative Extension personnel. Call (206) 296-3900 for a current schedule of neighborhood clinics, which operate April through September.

• YEAR-ROUND MASTER GARDENER WALK-IN CLINICS:
Fairwood Library, Renton, Saturdays, 10–2

Graham Visitors Center, Washington Park Arboretum, Seattle, Sundays, 10–2

Center for Urban Horticulture, University of Washington, Monday evenings, 4–8 and Tuesday, Wednesday, and Thursday afternoons, 12–4.

• MASTER GARDENER HOTLINE: (206) 296-3440, Monday through Friday, 10–4, to speak directly to a Master Gardener.

Books

As garden building is such a site-dependent activity, it is time well-spent for gardeners to learn all they possibly can about the native vegetation, weather, and soils of their area.

The Natural History of Puget Sound Country by Arthur Kruckeberg (Seattle, University of Washington Press, 1991) could be the Northwest's ecological bible, broad in its exploration of our landforms, climate patterns, and vegetation zones, with specific, useful information on microclimates and Puget Basin soils. Kruckeberg's earlier book, *Gardening with Native Plants of the Pacific Northwest* (Seattle, University of Washington Press, 1982), has chapters on the natural environment of natives and their uses in gardens and landscapes, along with descriptions and photos of hundreds of garden-worthy trees, shrubs, and ground covers.

For further exploration of soils, the new *Start with the Soil* by Grace Gershuny (Emmaus, PA, Rodale Press, 1993) is a thorough, practical handbook. Information on how to identify and deal with problem soils is given along with a healthy dose of reverence for fertile, living dirt.

The Urban/Suburban Composter by Mark Cullen and Lorraine Johnson (New York, St. Martin's Press, 1992) is another practical guide to soil renewal, written by authors with a passion for compost. "...A very basic rule of life is to put things back in their place after you're

finished with them. It just doesn't make sense to remove goodness from the earth without replenishing it." Their philosophy is summed up in the chapter, "Dirty Hands, Clean Conscience," along with specifics on creating productive soil.

As you raise your eyes from ground level, turn to local author Cass Turnbull's *The Complete Guide to Landscape Design, Renovation, and Maintenance* (White Hall, VA, Betterway Publications, Inc., 1991), one of the few guides to working with existing gardens. Clear line drawings and humorous, knowledgeable text enhance information on pruning, renovating overgrown gardens, and practical maintenance.

And if the secret to rewarding gardens is to understand your own soil and climate and then plant accordingly, use Nicola Ferguson's *Right Plant, Right Place* (New York, Summit Books, 1984) or the many lists (shade-tolerant plants, plants for hillsides and erosion control, etc.) in the front of the *Sunset Western Garden Book* (Menlo Park, CA, Land Publishing, 1988, new edition due out in March 1995).

The funny thing about gardening (and, no doubt, most other pursuits) is that the more you learn, the more ignorant you feel. As your questions multiply, turn to a local source for information on all things horticultural, *The Northwest Gardeners' Resource Directory* by Stephanie Feeney (5th edition, Bellingham, WA, Cedarcroft Press, 1994). Seed sources, flower and garden show schedules, plant sales, and gardens to visit are all listed here and updated annually with each new edition. Also check the listings for various clubs (Washington Native Plant Society, Hardy Fern Foundation, Northwest Perennial Alliance, etc.) to find like-minded plant enthusiasts.

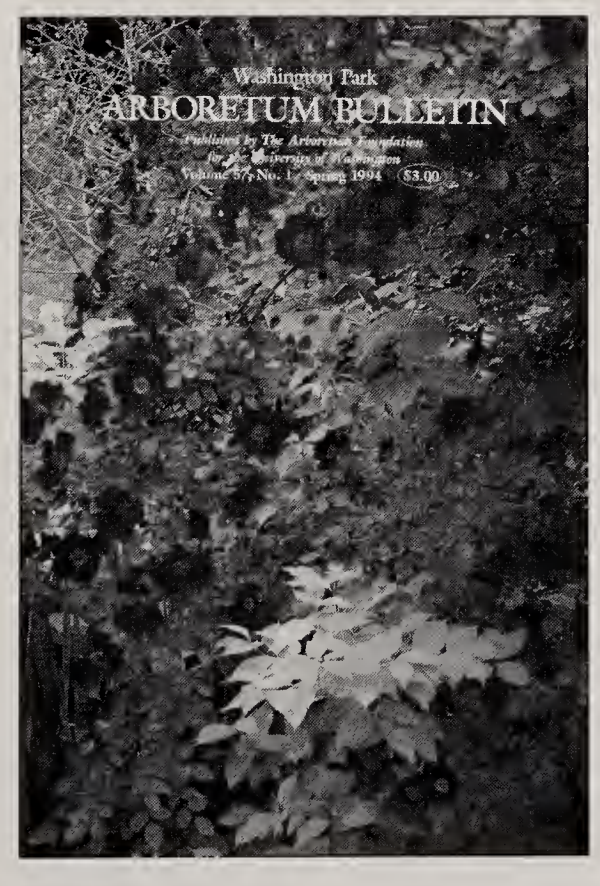
Consulting these sources before getting lost in the many design and plant books awaiting you can ensure that those shimmering perennials you hope to grow in an anticipated white border will tolerate your (well-amended) clay soil, and that the exotic-looking vine so glowingly described in the latest issue of a glossy magazine can survive the winter conditions in your garden. Before the exciting, artistic aspects of a garden can be realized, gardeners must deal with the soil and weather, renovation and worm bins, that lead the confident, knowledgeable gardener to a rewarding garden.

Freelance writer Valerie Easton is a librarian at the Elisabeth C. Miller Library, University of Washington Center for Urban Horticulture. She has been book review editor of the *Washington Park Arboretum Bulletin* and a member of its board since 1988.

NOTE: A Rose by Any Other Name

More on *Rosa moyesii*

The rose pictured on the cover of the spring 1994 issue has gone through many name changes since I first began growing it several years ago. Rosarians who visited the garden have identified it as *Rosa caudata*, *R. macrophylla*, *R. moyesii*, and *R. moyesii* 'Geranium'. My original plants came as cuttings from Ron Brightman, who had it identified by Brian Mulligan as a probable seedling from *R. moyesii* 'Geranium'. As it is definitely not true 'Geranium', Mr. Mulligan suggested a new cultivar name be given it. With the blessing of Ron Brightman, I have named the plant *Rosa moyesii* 'Regalia' in honor of the ceremonial button blankets worn during potlatches of the north coast Indian tribes. It will be sold in our 1995 catalog under this new name, ending, we hope, a long history of nomenclatural confusion.—Daniel J. Hinkley, Heronswood Nursery, Inc., Kingston, WA



Letters from plantsmen Brian Mulligan and Ronald Brightman challenged the nomenclature of the plant named on this cover.

Book Reviews

Jane Packer's New Flower Arranging.
Jane Packer and Louise Simpson. North Pomfret, VT: Trafalgar Square, 1994.
ISBN 0-943955-90-4.
$24.95, hard cover.

In the winter of 1991, the Northwest Flower and Garden Show prevailed upon Jane Packer to visit Seattle to lecture upon and demonstrate her distinctive approach to flower arranging. Her visit was a stunning success. Audiences were enchanted by her eclectic artistry and her unique skills.

During that visit, I was asked to help Ms. Packer in her preparations. Together, we roamed the high stalls of the Pike Place Market in search of kumquats, set out to find bun moss, and successfully located particularly beautiful quail eggs to boil and use in her displays. Because of these interactions, I was looking forward with more than my usual anticipation to this book and was not disappointed.

The book's organization is similar to that used in earlier works by Ms. Parker. Each section has the feeling of a well-considered, well-tried recipe. The list of necessary materials is succinctly presented and is followed by a clear and precise description of how the materials should be organized. In every instance, Packer provides a few additional paragraphs on the appropriateness of other flowers and foliage. I was particularly pleased that the majority of her flower palette could be grown in the Northwest—indeed, it was likely to be available in a neighbor's garden!

Jane Packer's charming use of seasonal plant material should make this book appealing not only to Northwest gardeners and dedicated flower arrangers but also to anyone who simply enjoys having natural presentations of flowers for special occasions in their homes. It is filled with ideas for weddings, holiday centerpieces, wreaths, and topiaries as well as suggestions for "fun" containers with which to make these arrangements.

Late last summer, I was asked to prepare flowers for a reception. Fortunately (or unfortunately) the budget was far from open ended. Since many of my garden's summer flowers were in decline, I looked to this recently acquired book for some ideas. Several of Packer's arrangements for autumn provided me with exactly what I was looking for, ready to be duplicated. The materials from her beautiful arrangement of goldenrod, feverfew, fennel, blackberries, rose hips, hydrangeas, buddleia, and *Sedum* 'Autumn Joy' were waiting in my garden.

Audiences will gain a better appreciation for the use of seasonal flowers and foliage in floral arranging in this book, which benefits from the generous use of exceptional color photographs. For those who enjoy flower arranging and who have attempted to use the natural bounty of Northwest gardens, this is an exceptional and inspirational reference.—Susie Marglin

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Susie Marglin, a long-time member of The Arboretum Foundation Board of Directors, has a certificate in flower arranging from South Seattle Community College and has done many arrangements for public events. She has been advertising director of the *Washington Park Arboretum Bulletin* for over six years and is a new editorial board member. Among her major volunteer activities, Susie chairs the Preview Committee gala for the Northwest Flower and Garden Show, which benefits Azalea Way.

The New Royal Horticultural Society Dictionary Index of Garden Plants.
Mark Griffiths. Portland, OR: Timber Press, 1994. ISBN 0-88192-246-3.
$60.00, hard cover.

Here in the Pacific Northwest we can grow a greater diversity of plant material than almost anywhere else. Unfortunately, many of the plants we can grow are almost unknown in garden literature. It is very frustrating to see a plant offered in a catalog or nursery and then be unable to find the name in any gardening book. *The New Royal Horticultural Society Dictionary of Gardening* went a long way toward solving this problem, with its listing of some 60,000 names. However, in four volumes at a price

upwards of $600.00, this is not a resource available to us all.

The *Index of Garden Plants* is a condensed version of the *RHS Dictionary* edited by Mark Griffiths. He has created a one-volume work that contains all 60,000 names, with ranges, descriptions, and hardiness zones. Unfortunately, condensing four volumes into one requires hard decisions about what is expendable. In an effort to preserve as much material as possible, the type size has been reduced sharply, making for difficult reading. Even so, the already minimal cultural information from the *Dictionary* has been removed. Missing also are the many line drawings depicting the differences between related plants.

Fortunately there are valuable additions and changes in the *Index* as well. Common names are indexed, which is a help when nurseries fail to provide the specific Latin name, and the section on the naming of plants has been made much clearer. The *Index* also retains the excellent glossary, invaluable for anyone wanting to understand botanical descriptions. Most important, being distilled from the *RHS Dictionary*, it is an up-to-date reference on accepted plant names.

The book is valuable for the advanced gardener wanting to know the correct name for a plant. It is also valuable for the adventurous gardener who finds a new plant and is willing to try it with only minimal knowledge of its cultural requirements. Often, just knowing whether a plant is annual or perennial, a tree or a shrub, is enough information to inspire a gardener to take it home. This book will provide that amount of information for a dazzling array of plants. It will not replace a standard work such as the *Sunset Western Garden Book*, but it includes so many more plants that it can be a very valuable addition to a gardener's library. If you cannot afford the new *RHS Dictionary*, this is an acceptable substitute. It has drawbacks, but there is no other one-volume work that covers anywhere near the amount of information.—Tracy D. Omar

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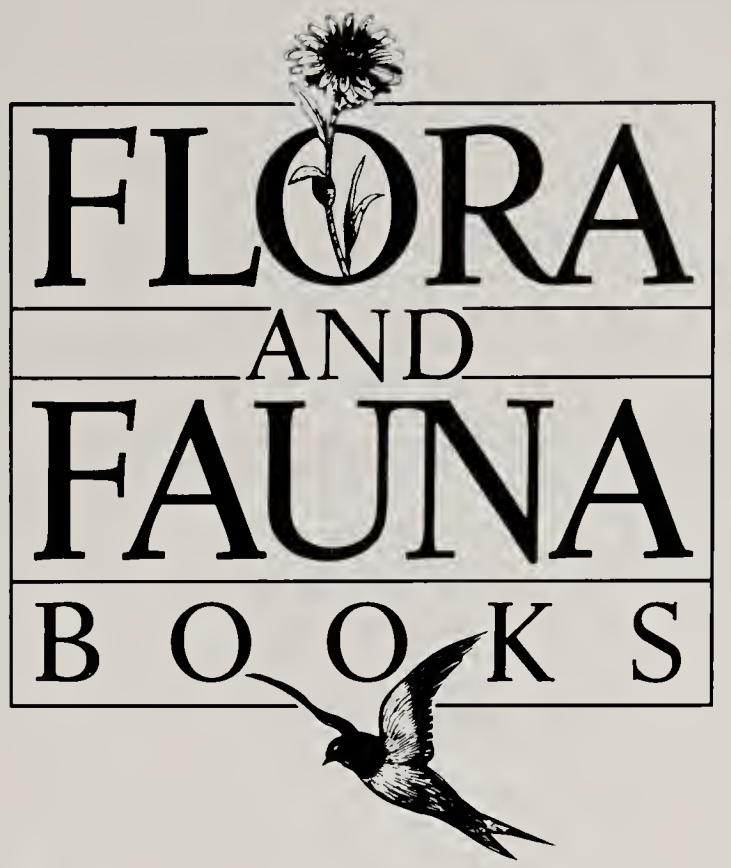
Tracy D. Omar is registrar and assistant curator of the Washington Park Arboretum. He is responsible for keeping records on and mapping the approximately 10,000 plants in the Arboretum's collections. Tracy compiled *The Woody Plant Collection in the Washington Park Arboretum*, published in 1994.



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In the Washington Park Arboretum

BY JOHN A. WOTT

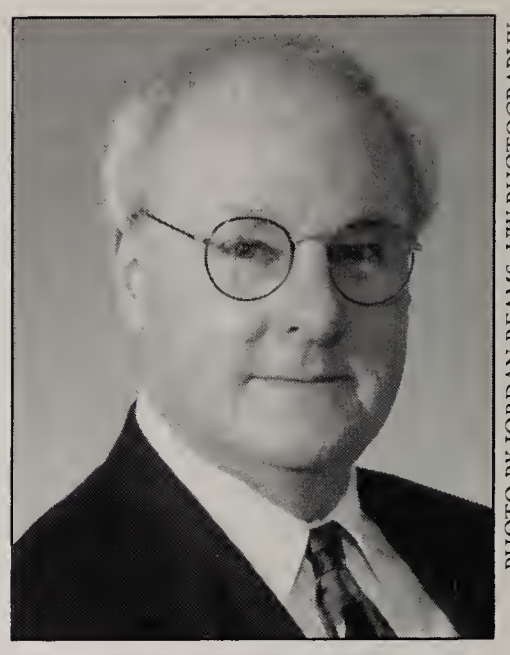

PHOTO BY JORDAN REAMS, UW PHOTOGRAPHY

New Seeds, Cuttings, and Plants

A new nursery is being constructed at Union Bay, south of the Douglas Research Conservatory at the University of Washington's Center for Urban Horticulture. This is where all of the Arboretum's introductions are grown to a larger size before planting in the Arboretum collections. For easier watering by new irrigation lines, a four- to six-inch layer of crushed gravel will be placed over a landscape fabric cover.

In 1994, Arboretum propagator Barbara Selemon was successful in producing a wide range of seeds, cutting, and plants. Accessions with an asterisk (*) are new to Arboretum collections.

From the Korean Expedition

Now in the Arboretum's container nursery are Korean plants, grown from seed. These woody plants were collected by nurseryman Daniel J. Hinkley during his fall 1993 expedition, which was sponsored, in part, by The Arboretum Foundation.

* *Buddleia vennifera* (38-94) is a Korean butterfly bush not well known in cultivation.

* *Carpinus coreana* (31-94), endemic to Korea, is a small tree (25 feet) with pendulous branches. The young shoots are dark brown.

C. laxiflora (32-94), which is not common in cultivation, will reach up to 50 feet and is

JOY SPURR

New Zealand garden

native to Japan, China, and Korea.

C. turczaninovii (33-94), native to northern China and Korea, is a tree-like shrub to 20 feet. In autumn it has a rich orange foliage.

* *Euodia daniellii* (34-94) will have white flowers in June; this tree-like shrub, which grows to 30 feet, is native to northern China and Korea.

**Syringa dilatata* (43-94) is a Korean lilac of deep color to 12 feet high. This fragrant plant should be a very early bloomer.

Slow Down for the New Zealand High Country

In October, I visited the north island of New Zealand where I saw several nurseries, garden centers, private gardens, and the Auckland Botanic Garden. I traveled with 45 plantspeople from Europe, Japan, the US, Australia, and New Zealand as part of the International Plant Propagators' Society international tour and meeting. Several native plant collectors and growers will soon be sending us plant material to include in the Arboretum's New Zealand native garden, dedicated just one year ago as a gift of the Seattle-Christchurch Sister City Committee. In September 1994, the new ambassador from New Zealand to the United States, the Honorable John Wood, visited the garden.

The New Zealand plants have all grown exceedingly well, several have already flowered, and a new interpretive sign adds to visitor understanding. Many people slow their automobiles to peer at the garden, which is very close to the road on the east side, as they drive along Arboretum Drive East.

Several new plants endemic to New Zealand have been grown from seed obtained from New Zealand's Dunedin Botanical Garden on the South Island.

* *Astelia fragrans* (93-94) (8-4E) is an evergreen rosette to two feet tall.

* *Carmichaelia arenaria* (94-94) (in the container nursery) with fragrant purple flowers, is a leafless, broom-like legume.

Olearia ilicifolia (91-94) (8-4E) yields fragrant white flowers in June on a broad shrub to six feet.

Shared by the National Arboretum

Two hollies have been successfully rooted in the container nursery from cuttings given to us by the National Arboretum, Washington, DC.

* *Ilex dimorphophylla* (349-94), a compact

In New Zealand, the Hibiscus Bloom in October.

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evergreen shrub to five feet, has young foliage that is very spiny; it is native to the Liukiu Islands off the coast of Japan.

* *I. georgei* (352-94), from southwestern China, is a compact spiny shrub with abundant red fruit.

From Director Emeritus Mulligan's Own Garden

Two new rhododendrons have been accessioned from the private garden of Brian O. Mulligan and his wife, Margaret. They are currently in the container nursery awaiting sufficient growth to plant in the Arboretum.

* *Rhododendron* x *impeanum* (249-94) is almost prostrate to one foot with lavender blue flowers.

* *Rhododendro*n 'Spring Snow' (250-94) was hybridized and named by Brian at the Washington Park Arboretum in 1978. Its light pink buds open to white, and it reaches up to five feet tall.

Saplings Goes into Autumn

Three hundred third- and fourth-graders received a one-hour native plant tour of the Arboretum (featuring ethnobotany of plants) with an additional hour on seed dispersal or leaf identification and keying. Dana Kirley, Arboretum Education Coordinator, organized the autumn program for students from Bryant, St. John's, McGilvra AE-IV, Sunset, and TT Minor schools. A generous contribution from Marguerite Corbally has helped to expand the Saplings program for spring 1995.

View the Restored Ponds

Late October and early November rains completely flushed and cleaned the newly restored Arboretum ponds. Work sponsored by over $55,000 in funds raised by the 1993 annual Arboretum Foundation appeal is now visible in the two ponds in the Woodland Garden and the small pond at the top of Rhododendron Glen. A multitude of birds, including one blue heron, have already returned, and brightly colored fall leaves were again floating in plenty of water.

Take advantage of new viewing areas with easy access, which have been added at each of the Woodland Garden ponds, through either large rock stepping stones or the new wood deck installed just off Azalea Way. This deck hides the overflow pipe, which needed special connections to the original wooden drainage pipe across Azalea Way.

Newly planted pond edges are protected by pine mat and bamboo fencing, which have been temporarily installed. The disturbed areas have now returned to a brilliant green, due to the efforts of City gardener John Candy and his crew.

The small upper pond in Rhododendron Glen has been cleaned and some plant material removed to make way for repair of a cracked liner and dam. Springs surround the pond, and one is apparently right under it.

Everyone has greatly enjoyed this gift of repair from The Arboretum Foundation, which is the non-profit fund-raising arm of the Arboretum.

Project manager: Christina Pfeiffer, Arboretum horticulturist.

Design support: Polly El Aidi and Iain Robertson

Contractor: Sonneman Design, Inc. (Lynn Sonneman and Jack Newton, who also donated some of their own time, and arranged for donations of plants from Wilderness Gardens and of rock and installation from Marenakos Rock Center).

Technical supervision: Bill Russell, Seattle Department of Parks and Recreation

Staff Changes

Steve Jensen, Gardener II, resigned in September in order to enter the graduate program in environmental business at the University of Washington. Steve was a great team member, and we wish him the best in his new studies.

John Schafer was hired to replace Jensen, effective October 24, 1994. John is a graduate of the Longwood Gardens Professional Training program, was once employed there, and for nine years was in landscape maintenance at John Carroll University in Cleveland, Ohio.

John A. Wott, Ph.D., is Director of Arboreta and professor of Urban Horticulture, Center for Urban Horticulture, University of Washington, Seattle. The UW manages the collections and the associated arboretum programs and works cooperatively with City of Seattle and the non-profit Arboretum Foundation.

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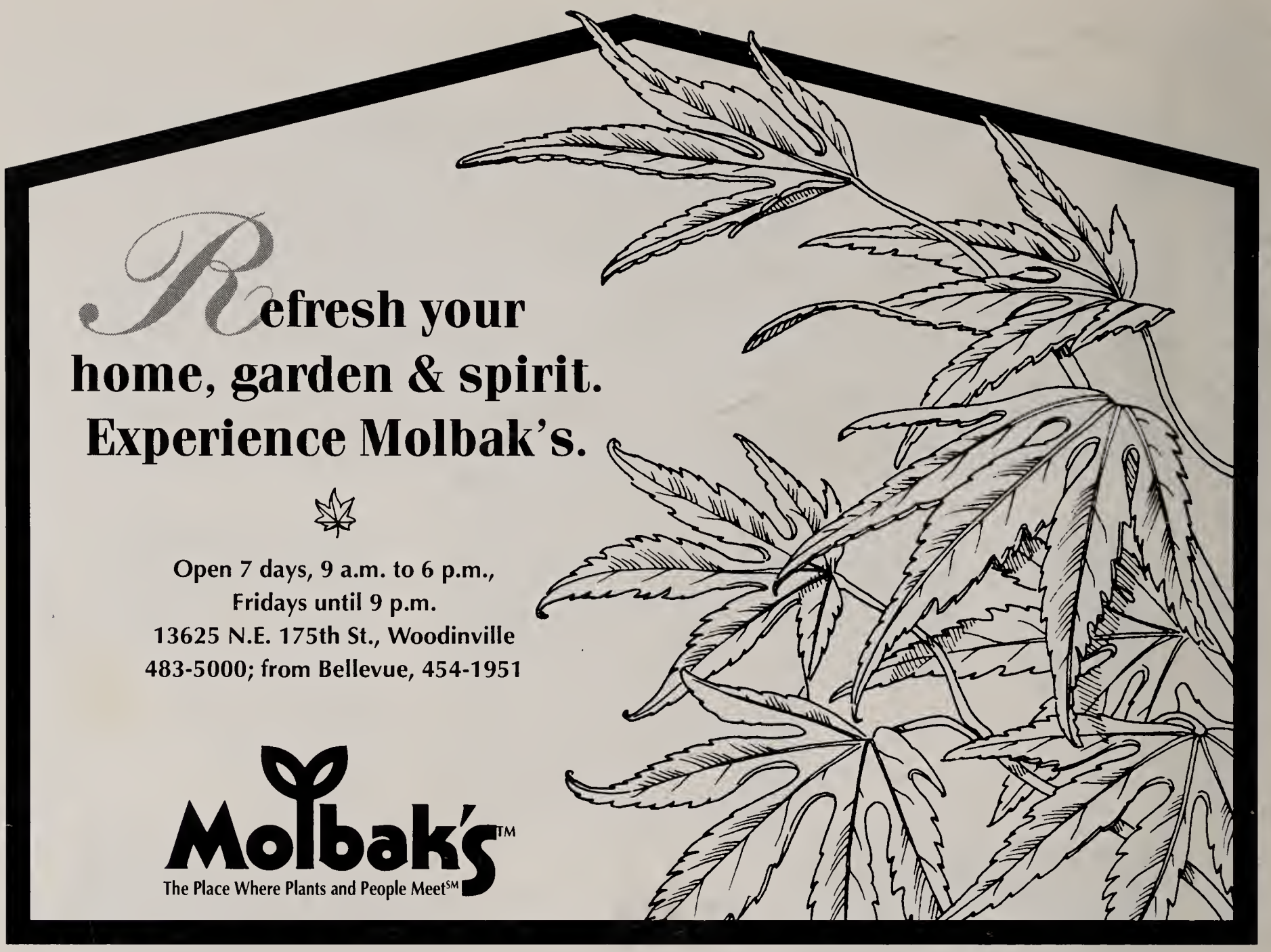

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